IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. :	10/698,659	Confirmation No.	4437
Applicant :	James A. Leistra et al.		
Filed :	10/31/2003		
TC/A.U. :	1762		
Examiner :	Elena Tsoy		
Docket No.:	03-292		
Cust. No. :	34704		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Appeal Brief

Dear Sir:

This brief is submitted in support of the notice of appeal filed on October 29, 2008.

(i) Real Party in Interest – The real party in interest is the assignee of record, namely, UTC Fuel Cells, LLC, now UTC Power Corporation by virtue of a corporate name change which will be recorded in due course.

(ii) Relater appeals and interferences – There are no Known related appeals or interferences.

(iii) Status of claims – The application contains 1-14 and 16-40. Claim 15 has been cancelled. Of claims 1-14 and 16-40, claims 1-3, 5-12, 14, 24-27, 29 and 37-38 are rejected and are on appeal. Claims 4, 13, 16-23, 28, 30-36 and 39-40 are withdrawn from consideration and are not on appeal.

(iv) Status of amendments – There were no responses filed after the issuance of the final action from which appeals is taken. Thus, the claims are as listed in the response prior to the final rejection, and also as shown in the claims appendix attached hereto.

(v) Summary of claimed subject matter - The application contains independent claims 1 and 25, each of which is discussed below.

Claim 1 calls for a method for making a membrane electrode assembly, comprising the steps of:

providing a membrane electrode assembly 10 comprising an anode 12 including a hydrogen oxidation catalyst; a cathode 14; and a membrane 16 disposed between said anode and said cathode (Fig. 1, specification page 3, lines 9-11); and

depositing a peroxide decomposition catalyst in at least one position selected from the group consisting of a layer 18 between said anode and said membrane and a layer between said cathode and said membrane (specification page 4, lines 25-27), wherein said peroxide decomposition catalyst has selectivity when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide (specification page 4, lines 3-4), and wherein said layer has a porosity of less than or equal to 20% and is less porous than said anode and said cathode (specification page 5, lines 10-12).

Claim 25 calls for a method for making a membrane electrode assembly, comprising the steps of:

providing a membrane electrode assembly 10 comprising an anode 12 including a hydrogen oxidation catalyst; a cathode 14; and a membrane 16 disposed between said anode and said cathode(Fig. 1, specification page 3, lines 9-11); and

depositing a peroxide decomposition catalyst in at least one position selected from the group consisting of a layer 18 between said anode and said membrane and a layer between said cathode and said membrane (specification page 4, lines 25-27), wherein said peroxide decomposition catalyst has selectivity

when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide(specification page 4, lines 3-4), wherein said layer has a porosity of less than or equal to 20% and is less porous than said anode and said cathode (specification page 5, lines 10-12), and wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Pd, Ir, C, Ag, Au, Rh, Ru, Os, Re, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb, Ce and combinations thereof (specification page 4, lines 15-18 and page 8, line 27 through page 9, line 2).

(vi) Grounds of rejection to be reviewed on appeal

Ground 1 - Whether claims 1-3, 5-9, 11-12, 14, 24-27, 29 and 37-38 are obvious over Wessel et al. (US 20030008196) in view of Cadaval Fernandez De Leceta et al (US 6,685,806).

Ground 2 - Whether claims 1-3, 5-9, 11, 12, 14, 24-27, 29 and 37-38 are obvious over Asukabe (US 6,335,112) in view of Wessel and Cadaval.

Ground 3 - Whether claims 1-3, 5-9, 11, 12, 14, 24-27, 29 and 37-38 are obvious over Menjak et al. (US 20030059664) in view of Wessel and Cadaval.

Ground 4 - Whether claim 10 is obvious over Wessel/Asukabe in view of Wessel/Menjak/ all in view of Cadaval and Nakawa (JP 07024315)

(vii) Argument

Ground 1

The Examiner has conceded that Wessel et al. fail to teach that their "additive coating layer" has a porosity of less than or equal to 20% as called for in independent claims 1 and 25.

The Examiner turns to Cadaval '806 and states that the '806 patent teaches that the porosity of the electrode layer decreases in the direction of a cation-exchange membrane with a porosity gradient of 5-15% per 1 micron. The Examiner has focused on this teaching without considering the teaching as a whole. The teaching cited by the Examiner in the abstract and column 6, lines 50-54, teach that such electrodes have a porosity between 40 and 70% decreasing in the direction of the membrane, and that this decrease is with a porosity gradient from 5-15%. In other words, the porosity varies between 70 and 40%. Nowhere does this teach anything less than 20% as called for by the present claims. Further, this is porosity within the electrode, and not in an adjacent layer. It is respectfully submitted that these are clear distinctions between the '806 patent and the subject matter of the present claims, particularly where the '806 patent is being cited for supposedly relevant teaching.

None of the art of record discloses or suggests the less than 20% limitation of independent claim 1. The Examiner's rejection is therefore in error and should be reversed.

Ground 2

This rejection also relies upon Cadaval ‘806 for the teaching of less than 20% porosity, and is therefore deficient for the reasons set forth above in Ground 1. This rejection should be reversed and such action is respectfully solicited.

Ground 3

This rejection also relies upon Cadaval ‘806 for the teaching of less than 20% porosity, and is therefore deficient for the reasons set forth above in Ground 1. This rejection should be reversed and such action is respectfully solicited.

Ground 4

This rejection is of dependent claim 10 which is supported by the same argument supporting claim 1 in ground 1 above. Thus, the Examiner’s reliance upon Cadaval ‘806 for the teaching of less than 20% porosity is misplaced, and the rejection is therefore deficient for the reasons set forth above in Ground 1. This rejection should be reversed and such action is respectfully solicited.

This paper is accompanied by authorization to charge a deposit account for the fee for filing an appeal brief. It is believed that no other fee is due in connection with this paper.

If any such fee is due, please charge same to deposit account 02-0184.

Respectfully submitted,

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Claims appendix

1. A method for making membrane electrode assembly, comprising the steps of:

providing a membrane electrode assembly comprising an anode including a hydrogen oxidation catalyst; a cathode; and a membrane disposed between said anode and said cathode; and

depositing a peroxide decomposition catalyst in at least one position selected from the group consisting of a layer between said anode and said membrane and a layer between said cathode and said membrane, wherein said peroxide decomposition catalyst has selectivity when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide, and wherein said layer has a porosity of less than or equal to 20% and is less porous than said anode and said cathode.

2. The method of claim 1, wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Pt, Pd, Ir, C, Ag, Au, Rh, Ru, Os, Re, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb, Ce and combinations thereof.

3. The method of claim 2, wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Pt, Pd, Ir, C, Ag, Au, Rh, Ru and combinations thereof.

4. (Withdrawn) The method of claim 2, wherein said peroxide decomposition catalyst is supported on a support selected from

the group consisting of oxides of Ru, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb and Ce, Mn, zeolites, carbon and combinations thereof.

5. The method of claim 1, further comprising the step of depositing an oxygen reduction catalyst in at least one position of said group of positions.

6. The method of claims 5, wherein said oxygen reduction catalyst is selected from the group consisting of oxides of Ru, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb and Ce, Mn, zeolites, carbon and combinations thereof.

7. The method of claim 5, wherein said oxygen reduction catalyst is positioned in a layer between said cathode and said membrane.

8. The method of claim 1, wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Ag, Au, C and combinations thereof.

9. The method of claim 8, wherein said peroxide decomposition catalyst is supported on carbon.

10. The method of claim 1, wherein said peroxide decomposition catalyst is carbon.

11. The method of claim 1, wherein said peroxide decomposition catalyst is deposited as said layer disposed between said anode and said membrane.

12. The method of claim 11, wherein said layer is electrically connected to said anode.

13. (Withdrawn) The method of claim 11, further comprising the step of depositing a layer of said peroxide decomposition catalyst between said membrane and said cathode.

14. The method of claim 11, wherein said layer further comprises a portion of said hydrogen oxidation catalyst.

15. (Cancelled)

16. (Withdrawn) The method of claim 1, wherein said peroxide decomposition catalyst is also deposited in said membrane.

17. (Withdrawn) The method of claim 16, wherein said depositing step comprises impregnating said peroxide decomposition catalyst into said membrane from a surface of said membrane to a desired depth into said membrane.

18. (Withdrawn) The method of claim 16, wherein said membrane has an anode surface and a cathode surface and wherein said peroxide decomposition catalyst is deposited in said membrane at said anode surface and said cathode surface whereby peroxide generated at either of said anode and said cathode is decomposed in the presence of said peroxide decomposition catalyst.

19. (Withdrawn) The method of claim 1, wherein said peroxide decomposition catalyst is deposited in at least one of said anode and said cathode.

20. (Withdrawn) The method of claim 19, wherein said peroxide decomposition catalyst is deposited in both said anode and said cathode.

21. (Withdrawn) The method of claim 20, further comprising depositing a greater concentration of said peroxide decomposition catalyst in said anode than said cathode.

22. (Withdrawn) The method of claim 20, wherein said anode is more hydrophilic than said cathode.

23. (Withdrawn) The method of claim 20, further comprising depositing a layer of said peroxide decomposition catalyst between said anode and said membrane.

24. The method of claim 1, wherein said peroxide decomposition catalyst is deposited adjacent to said anode.

25. A method for making a membrane electrode assembly, comprising the steps of:

providing a membrane electrode assembly comprising an anode including a hydrogen oxidation catalyst; a cathode; and a membrane disposed between said anode and said cathode; and

depositing a peroxide decomposition catalyst in at least one position selected from the group consisting of a layer between said anode and said membrane and a layer between said cathode and said membrane, wherein said peroxide decomposition catalyst has selectivity when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide, wherein said layer has a porosity of less than or equal to 20% and is less porous than said anode and said cathode, and wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Pd, Ir, C, Ag, Au, Rh, Ru, Os, Re, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb, Ce and combinations thereof.

26. The method of claim 25, wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Pd, Ir, C, Ag, Au, Rh, Ru and combinations thereof.

27. The method of claim 25, wherein said peroxide decomposition catalyst comprises an element selected from the group consisting of Ag, Au, C, and combinations thereof.

28. (Withdrawn) The method of claim 25, wherein said peroxide decomposition catalyst is supported on a support selected from the group consisting of oxides of Ru, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb, and Ce, Mn, zeolites, carbon and combinations thereof.

29. The method of claim 1 or 25, wherein said depositing step is carrier out ex-situ.

30. (Withdrawn) The method of claim 29, wherein said depositing step comprises mixing said hydrogen peroxide decomposition catalyst with an ionomer to provide a mixture, and forming said mixture into said membrane having said hydrogen peroxide decomposition catalyst disposed therethrough.

31. (Withdrawn) The method of claim 29, wherein said depositing step comprises swelling said membrane in alcohol to provide a swelled membrane; and
inserting said catalyst into said swelled membrane.

32. (Withdrawn) The method of claim 29, wherein said catalyst is deposited as a catalyst precursor, and further comprising the steps of reducing said catalyst precursor to form said catalyst.

33. (Withdrawn) The method of claim 29, wherein said depositing step comprises impregnating said membrane with said catalyst.

34. (Withdrawn) The method of claim 29, wherein said depositing step is carried out so as to provide a substantially uniform distribution of said catalyst through said membrane.

35. (Withdrawn) The method of claim 29, wherein said depositing step is carried out so as to provide a substantially

non-uniform distribution of said catalyst relative to said membrane.

36. (Withdrawn) The method of claim 35, wherein said depositing step comprises forming a plurality of layers at least one of which contains said catalyst, and laminating said layers together.

37. The method of claim 25, further comprising the step of depositing an oxygen reduction catalyst in at least one position of said group of positions.

38. The method of claims 37, wherein said oxygen reduction catalyst is selected from the group consisting of oxides of Ru, Sn, Si, Ti, Zr, Al, Hf, Ta, Nb and Ce, Mn, zeolites, carbon and combinations thereof.

39. (Withdrawn) The method of claim 1 or claim 25, wherein said depositing steps is carried out in-situ.

40. (Withdrawn) The method of claim 39, wherein said depositing step comprises subjecting said MEA to conditions whereby catalyst from at least one of said anode and said cathode migrates into said membrane.

(ix) Evidence Appendix – None

(x) Related Proceedings Appendix - None